

V. CLAIMS

- 1 1. A data processing device comprising:
 - 2 - at least one input for receiving data including
 - 3 - viewer profile data; and
 - 4 - data regarding a television program; and
 - 5 - a processor, the processor being adapted to perform the
 - 6 following
 - 7 - calculating a probability that the television program
 - 8 is a desired one; and
 - 9 - supplying a recommendation regarding the television
 - 10 program based on the probability.
- 1 2. The data processing device of claim 1 wherein the input is
- 2 coupled with a medium readable by the data processing device.
- 1 3. The data processing device of claim 2, wherein the medium
- 2 embodies the viewer profile.
- 1 4. The data processing device of claim 3, wherein
- 2 > the medium is local to the data processing device and
- 3 > the viewer profile is arranged so as to be incrementally

4 updatable.

1 5. The data processing device of claim 3, wherein the processor
2 maintains the viewer profile in accordance with a data
3 structure comprising:

- 4 ➤ a list of feature values; and
5 ➤ for each element of the list, a respective number of times
6 programs having that feature value were watched.

7 6. The data processing device of claim 5, wherein the data
8 structure further comprises, for each element of the list, a
9 respective number of times programs having that feature value
were not watched.

1 7. The data processing device of claim 6, wherein the processor
2 is further arranged to perform the following, each time a
3 user watches a new program,
4 ➤ first adding, to the list, feature values or counts of such
5 feature values, associated with that new program;
6 ➤ selecting at least one companion program to the new
7 program, the companion program being selected at random from
8 a program schedule, which companion program has not been
9 watched; and

10 ➤ second adding, to the list, feature values of the companion
11 program, or counts of such feature values.

1 8. The data processing device of claim 5, wherein the processor
2 is further arranged to perform the following, each time a
3 user watches a new program: first adding, to the list,
4 feature values or counts of such feature values, associated
5 with that new program;

9. The data processing device of claim 2, wherein the medium
 embodies the data regarding the television program.

10. The data processing device of claim 1, wherein the input is a
 network connection.

11. The data processing device of claim 1, wherein calculating
 comprises using a Bayesian classifier.

12. The data processing device of claim 11, wherein the
 processor is further adapted to subject the viewer profile to
 a noise threshold calculation prior to using the Bayesian
 classifier.

1 13. The data processing device of claim 12, wherein
2 > the viewer profile data comprises
3 > a list of feature values;
4 > a respective negative count for each element of the list,
5 the negative count indicating a number of times programs
6 having that feature value have not been watched;
7 > a respective positive count for each element of the list,
8 the positive count indicating a number of times programs
9 having that feature value have been watched;
10 > the noise threshold calculation comprises
11 > selecting a sub-list comprising at least feature values
12 having at least one specific type of feature;
13 > choosing the highest negative count in the sub-list as the
14 noise threshold;
15 the recommendation comprises a program selected from a group
16 having at least one feature value having a positive or negative
17 count in the viewer profile, which count exceeds the noise
18 threshold.

1 14. The data processing device of claim 12, wherein subjecting
2 the viewer profile to the noise threshold further comprises using
3 observations gathered by a known random process to estimate a
4 reasonable noise threshold.

15.The data processing device of claim 13, wherein the specific type comprises a day and time of day feature type.

16.The data processing device of claim 13, wherein the specific type comprises a station identification feature type.

1 17.The data processing device of claim 1, wherein the viewer
2 profile data comprises a plurality of respective counts of
3 programs watched, each respective count indicating how many
4 programs watched had a respective feature.

1 18.The data processing device of claim 17, wherein calculating
2 comprises calculating a probability that the television
3 program is in a particular class.
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1 19.The data processing device of claim 18, wherein the class is
2 one of

3 ➤ programs the viewer is interested in, and

4 ➤ programs the viewer is not interested in.

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1 20. The data processing device of claim 1, wherein calculating
2 the probability comprises:

3 - computing a prior possibility, of whether a program is
4 desired or not;

5 - computing a conditional probability of whether a feature fi
6 will be present if a show is desired or not; and

7 - computing a posterior probability of whether program is
8 desired or not, based on the conditional probability and the
9 prior probability.

1 21.The data processing device of claim 1, wherein it is assumed
2 that programs watched are programs that the viewer is
3 interested in.

1 22. The data processing device of claim 1, wherein the processor
2 is further adapted to provide a recommendation regarding an
3 additional item, other than a television program, based on the
4 viewer profile.

1 23. The data processing device of claim 1, wherein the processor
2 is further adapted to occasionally recommend a surprise show
3 that has relatively few features in common with watched shows.

1 24. The data processing device of claim 1, wherein

- 2 ➤ the viewer profile comprises a list of features types and
3 values for such feature types;
- 4 ➤ the feature types are selected from at least two sets,
5 including
 - 6 ➤ a first set of feature types whose values are deemed non-
7 independent; and
 - 8 ➤ a second set of feature types whose values are deemed
9 independent; and
- 10 ➤ calculating a probability comprises
 - 11 ➤ applying a Bayesian classifier calculation corresponding to
12 feature types from the second set; and
 - 13 ➤ applying a modified Bayesian classifier calculation

14 corresponding to feature types from the first set.

1 25. The data processing device of claim 24, wherein
2 ➤ with respect to features of the first set, the modified
3 Bayesian classifier calculation considers only feature values
4 that match with a show being classified.

1 26. At least one medium readable by a data processing device and
2 embodying software arranged to perform the following
3 operations:

- 4 - calculating a probability that a television program is
5 a desired one, based on a viewer profile and data
6 regarding the television program; and
7 - supplying a recommendation regarding the television
8 program based on the probability.

27. The at least one medium of claim 26, wherein the at least one medium further embodies the viewer profile.

28. The at least one medium of claim 27, wherein the viewer profile is arranged so as to be incrementally updatable.

1 29. The at least one medium of claim 27, wherein the viewer

profile is embodied as a data structure comprising:

- a list of feature values; and
- for each element of the list, a respective number of times programs having that feature value were watched.

30. The at least one medium of claim 29, wherein the data structure further comprises, for each element of the list, a respective number of times programs having that feature value were not watched.

31. The at least one medium of claim 30, wherein the software is further arranged to perform the following, each time a user watches a new program,

- first adding, to the list, feature values or counts of such feature values, associated with that new program;
- selecting at least one companion program to the new program, the companion program being selected at random from a program schedule, which companion program has not been watched; and
- second adding, to the list, feature values of the companion program, or counts of such feature values.

32. The at least one medium of claim 29, wherein the software

2 is further arranged to perform the following, each time a user
3 watches a new program: first adding, to the list, feature
4 values or counts of such feature values, associated with that
5 new program.

33 The at least one medium of claim 26, wherein the at least
one medium embodies the data regarding the television
program.

34 The at least one medium of claim 26, wherein calculating
comprises using a Bayesian classifier.

35 The at least one medium of claim 34, wherein the software is
further adapted to subject the viewer profile to a noise
threshold calculation prior to using the Bayesian
4 classifier.

1 36 The at least one medium of claim 35, wherein

2 ➤ the viewer profile data comprises

3 ➤ a list of feature values;

4 ➤ a respective negative count for each element of the list,
5 the negative count indicating a number of times programs
6 having that feature value have not been watched;

- 7 ➤ a respective positive count for each element of the list,
- 8 the positive count indicating a number of times programs
- 9 having that feature value have been watched;
- 10 ➤ the noise threshold calculation comprises
- 11 ➤ selecting a sub-list comprising at least feature values
- 12 having at least one specific type of feature;
- 13 ➤ choosing the highest negative count in the sub-list as the
- 14 noise threshold;
- 15 ➤ the recommendation comprises a program selected from a group
- 16 having at least one feature value having a positive or negative
- 17 count in the viewer profile exceeding the noise threshold.

37. The data processing device of claim 35, wherein subjecting the viewer profile to the noise threshold further comprises using observations gathered by a known random process to estimate a reasonable noise threshold.

38. The at least one medium of claim 36, wherein the specific type comprises a day and time of day feature type.

39. The at least one medium of claim 36, wherein the specific type comprises a station identification feature type.

1 40. The at least one medium of claim 26, wherein the viewer
2 profile data comprises a plurality of respective counts of
3 programs watched, each respective count indicating how many
4 programs watched had a respective feature.

1 41. The at least one medium of claim 40, wherein calculating
2 comprises calculating a probability that the television
3 program is in a particular class.

4 42. The at least one medium of claim 40, wherein the class
5 comprises at least one of programs the viewer is interested
6 in and programs the viewer is not interested in.

7 43. The at least one medium of claim 26, wherein calculating the
8 probability comprises:

- 9 - computing a prior possibility, of whether a program is
desired or not;
- computing a conditional probability of whether a feature fi
will be present if a show is desired; and
- computing a posterior probability of whether program is
desired or not, based on the conditional probability and the
prior probability.

1 44. The at least one medium of claim 26, wherein it is assumed
2 that programs watched are programs that the viewer is
3 interested in.

1 45. The medium of claim 26, wherein the software is further
2 arranged to provide a recommendation regarding an additional
3 item, other than a television program, based on the viewer
4 profile.

5 46. The at least one medium of claim 26, wherein the software is
6 further arranged to occasionally recommend a surprise show
7 that has relatively few features in common with watched show.

8 47. The at least one medium of claim 26, wherein

- 9 > the viewer profile comprises a list of features types and
10 values for such feature types;
11 > the feature types are selected from at least two sets,
12 including
13 > a first set of feature types whose values are deemed non-
14 independent; and
15 > a second set of feature types whose values are deemed
16 independent; and

- 10 > calculating a probability comprises
- 11 > applying a Bayesian classifier calculation corresponding to
- 12 feature types from the second set; and
- 13 > applying a modified Bayesian classifier calculation
- 14 corresponding to feature types from the first set.

1 48. The at least one medium of claim 47, wherein with respect to
2 features of the first set, the modified Bayesian classifier
3 calculation considers only values that match with a show being
4 classified.

1 49. A computer method comprising performing the following
2 operations in a data processing device:
3 - Receiving a set of data;
4 - Filtering the data in accordance with a noise criterion;
5 - Drawing a conclusion from the filtered data based on a
6 Bayesian classifier calculation; and
7 - Presenting the conclusion to a user.

1 50. The method of claim 49 wherein the noise criterion is based
2 on a frequency of instances of a particular types of data
3 within set, which types are believed to likely represent
4 noise.

1 51. A data processing method comprising performing the following
2 operations in a data processing device:

3 - first receiving data reflecting physical observations, which
4 data includes a list of feature values and observations
5 about feature values, some of which feature values are
6 independent and some of which are not;

7 - second receiving data about an item to be classified, the
8 data about the item to be classified including feature
9 values;

10 - maintaining a division of the data reflecting physical
11 observations into at least two sets, including

12 - a first set including those feature values which are
13 deemed not independent; and

14 - a second set including those feature values which are
15 deemed independent;

16 - performing a probabilistic calculation on the data
17 reflecting physical observations and the data regarding an
18 item to be classified including:

19 - applying a Bayesian classifier calculation with respect
20 to feature values relating to the second set; and

21 - applying a modified Bayesian classifier calculation

